

IN THE CLAIMS

Please cancel Claims 1, 12, and 16 without prejudice or disclaimer.

Claim 1 (cancelled)

Claim 2 (currently amended): The method according to Claim 4 I wherein said train of pulses comprises only two or three pulses.

Claim 3 (currently amended): The method according to Claim 4 I wherein said wire is selected from a group consisting of gold, copper, silver, alloys thereof, plated materials, and insulated metal wires.

Claim 4 (currently amended): The method according to Claim 4 I wherein said wire is selected from a group consisting of wire diameters in the range from about 15 to 75 μm for gold and about 25 to 75 μm for copper.

Claim 5 (currently amended): The method according to Claim 4 I wherein said wire melting and ball forming is performed in ambient air.

Claim 6 (currently amended): The method according to Claim 4 I wherein said train of EFO current pulses is further controlled to reduce size and damage in the heat-affected zone, thereby providing smooth wire loop formation.

Claim 7 (original): A method for forming a substantially spherical free air ball on a fine non-oxidizable wire in a computerized bonder having an electronic flame-off (EFO) apparatus operable to generate pulses of different heights and widths, comprising the steps of:

positioning a free end of said wire opposite to an EFO electrode, spaced apart by a gap;

applying a train of EFO current pulses between said electrode and said wire;

controlling said pulse heights to melt a pre-determined volume of said wire
controlling said pulse widths to create a substantially spherical ball shape; and
automatically calculating the train of consecutive EFO current pulses of various
heights and widths to produce a desired ball characteristic in a predetermined amount
of time.

~~The method according to Claim 4~~ wherein said train of EFO current pulses provides a continuous series of pulses of progressively lower heights, yet various pulse widths.

Claim 8 (original): The method according to Claim 7 wherein said pulse train of progressively lower heights minimizes the heat affected zone of the wire.

Claim 9 (currently amended): The method according to Claim 4 z wherein said train of EFO current pulses provides a series of pulses alternating between high and low heights and various widths.

Claim 10 (original): The method according to Claim 9 wherein said low pulse height is configured to prevent overheating of the free air ball and wire necking while maintaining the EFO arc.

Claim 11 (currently amended): The method according to Claim 4 z wherein said automatic pulse train calculation is provided by pre-determined empirical data stored in said computerized bonder.

Claim 12 (cancelled)

Claim 13 (previously presented): A method of forming a ball at the end of a wire,
comprising the step of:
exposing an end of the wire to a plurality of current pulses, wherein each pulse in
said plurality of said current pulses has a lower magnitude than a preceding pulse,

~~The method of Claim 12~~ wherein the plurality of current pulses comprises three pulses, wherein the first of the three pulses is of a first duration, the second of the three pulses is of a second duration, the second duration being shorter than the first duration, and the third of the three pulses is of a third duration, the third duration being longer than the first and second durations, and
wherein said first, second, and third pulses are successively applied.

Claim 14 (currently amended): The method of Claim 42 ~~13~~ wherein the a last pulse in said plurality is of a magnitude that is about half the magnitude of the first pulse in said plurality.

Claim 15 (currently amended): The method of Claim 42 ~~13~~ wherein the duration of the last pulse in said plurality is over twice as long as the duration of the first pulse in said plurality.

Claim 16 (cancelled)

Claim 17 (currently amended): A method of forming a ball at the end of a wire, comprising the steps of:

exposing the end of the wire to a first current pulse;

exposing the end of the wire to a second current pulse, wherein the second pulse is of lesser magnitude than the first pulse; and

exposing the end of the wire to a third current pulse, wherein the third pulse is of a magnitude between the magnitudes of the first and second pulses.

~~The method of Claim 16~~ wherein the first of the three pulses is of a first duration, the second of the three pulses is of a second duration, the second duration being shorter than the first duration, and the third of the three pulses is of a third duration, the third duration being longer than the first and second durations.

Claim 18 (currently amended): The method of Claim 46 ~~17~~ wherein the third current pulse is of a magnitude that is about half the magnitude of the first current pulse.

Claim 19 (currently amended): The method of Claim 46 17 wherein the duration of the third current pulse is over twice as long as the duration of the first current pulse.